

# Low VOC Barrier Coatings

## Alternative AST Coatings to Reduce Emissions and Maintenance Costs

### Background

As a barrier against corrosion, Department of Defense (DoD) above ground storage tanks (ASTs) have typically received a three-coat, high volatile organic compound (VOC), exterior coating system per MIL-DTL-24441, consisting of an epoxy primer and midcoat followed by a polyurethane topcoat. These coating formulations contain up to 350 g/L of VOCs. Maintenance painting is generally required at least every eight years using a combination of the same three-coat system.

These high VOC coating systems may not be used when the emissions exceed local air quality standards. As of August 2006, the California South Coast Air Quality Management District requires industrial maintenance coatings not exceed 100 g/L of VOCs.

The NAVFAC Engineering and Expeditionary Warfare Center (NAVFAC EXWC) has successfully demonstrated and validated a suitable very low VOC alternative coating system for ASTs. The new system consists of the Small Business Innovative Research (SBIR) Program developed low vapor barrier coating (LVBC) for use as a "direct-to-weathered paint" barrier coat, followed by a Zero-VOC Topcoat (ZVT).



### Technology

PolySpec Inc. has developed a 99 percent solids, high-build, low-VOC (less than 5 g/L), two component proprietary blend of Bis-F epoxy and liquid polysulfide, which displayed maximum adhesion to industrial topcoats, good tensile strength, outstanding flexibility, and very good barrier protection. This coating, used as a primer, is followed by a Zero-VOC Urethane Topcoat (ZVT; MIL-PRF-85285D, Type III, Class W).

At the one-year field performance evaluation, the LVBC/ZVT maintenance painting system successfully exceeded performance criteria for corrosion (< 0.1%), peeling (< 0.1%), blistering (< 0.1%), cracking, chalking, biological growth, adhesion and other criteria.

As a result of field performance, commercial standards are being developed for use by DoD activities with exterior steel structures in need of maintenance repainting. These include the Master Painters Institute (MPI) Detailed Performance Standard (DPS) entitled "MPI #213 Two-Coat Low VOC Barrier System for Industrial Maintenance," and the Unified Facilities Guide Specification (UFGS) - 09 97 13.25 "Maintenance Coating of Steel Structures".





## *Technology Benefits*

Annually, the Navy typically performs maintenance painting (repainting) on no less than 15 ASTs containing at least 8,000 square feet (sq-ft.) per AST, at least 20,000 sq-ft. of above ground steel piping, a minimum of one tall antenna tower (> 12,000 sq-ft.) and other miscellaneous structural steel components (>5,000 sq-ft.).

Maintenace exterior painting of these items using the LVBC/ZVT system should reduce annual DoD VOC emissions by 22,750 pounds, representing a 93% reduction, as well as producing annual savings in excess of \$1.5M when compared to the current system of complete coating removal and re-application.

## *Costs*

During the demonstration, NAVFAC EXWC experienced costs of \$7.50 per sq-ft. for coating two large ASTs with total external surface areas of 13,375 sq-ft.

## *Availability*

The product is currently available from the following manufacturer:

PolySpec Inc.  
6614 Grant Road  
Houston, TX 77066  
(281) 397-0033

Sponsored by:

Environmental Security Technology Certification Program  
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